

REMARKS

Claims 1-15 are pending in the present application.

Entry of the above amendments is earnestly solicited.
An early and favorable first action on the merits is earnestly requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully submitted,

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Attachments

VERSION WITH MARKINGS TO SHOW CHANGES MADEIN THE ABSTRACT OF THE DISCLOSURE:

The Abstract of the Disclosure has been amended as follows:

ABSTRACT

A drift tube (15) linear accelerator (linac) (4) that can be used for the acceleration of low energy ion beams ~~is disclosed.~~ The particles enter the linac (4) at low energy and are accelerated and focused along a straight line in a plurality of resonant accelerating structures (8) interposed by coupling structures (9) up to the desired energy, ~~for instance for therapeutic needs.~~ In the accelerating structures (8), excited by an H-type resonant electromagnetic field, a plurality of accelerating gaps (20) is provided between said drift tubes (15), ~~said drift tubes being supported by stems, for instance alternatively horizontally (16) and vertically (17) disposed.~~ A basic module (7) ~~is disclosed,~~ composed of two accelerating structures (8) and an interposed coupling structure (9), or if necessary a modified coupling structure (9A) connected to a RF power generator (11), ~~being,~~ is if necessary linked if necessary to a vacuum system (13) and equipped if necessary with one or more quadrupoles (18). ~~Said basic module (7) can be expanded to get modules (7A) that present an odd number n of coupling structures (9, 9A) which still if necessary are equipped with one or more quadrupoles (18), and an even number $N = n + 1$ of accelerating structures (8). The proposed linac (4) contains one or more modules (7, 7A) and allows obtaining a large accelerating gradient and a very compact structure.~~
(Fig. 1).

IN THE CLAIMS:

The claims have been amended as follows:

8. System of ion beam acceleration, characterised by the fact that it comprises, sequentially, an ion source (1), if necessary a pre-accelerator injector (2), if necessary a low energy beam transport line (3), a linac (4) for ion beam acceleration up to the energy required for a particular application, according to ~~one or more of the claims~~claim 1 to 7, and furthermore if necessary a high energy beam transport line (5), and an area or device (6) where the accelerated beam is used.

11. Method for accelerating a ion beam in a linac, wherein the ion beam, preliminary collimated, pre-accelerated, focused and if necessary steered in a low energy beam transport line (3), is injected into a linac (4) according to ~~one or more of the claims~~claim 1 to 10 in which:

- the beam acceleration is obtained by radiofrequency electric fields whose level is substantially constant in all said accelerating gaps (20) belonging to the same module (7, 7A) foreseen in the linac (4), said module or modules (7, 7A) present a single input (12) for the RF power, for each module (7, 7A) foreseen, where said single input (12) for RF power is connected with a single modified coupling structure (9A),
- the transverse focusing is obtained with magnetic fields produced by quadrupoles (18), preferably provided between two or more accelerating structures (8),
- furthermore at the linac (4) output, the accelerated ion beam is if necessary steered in a higher energy beam transport line (5) in the area or to the device (6) where it is to be used.

13. Use of a linac or a system comprising a linac according to ~~one or more of claims~~claim 1 to 10 for medical applications.

14. Use of a linac or a system comprising a linac according to ~~one or more of claims~~claim 1 ~~to 10~~ for fundamental and applied research and related applications.

15. Use of a linac or a system comprising a linac according to ~~one or more of claims~~claim 1 ~~to 10~~ for the production of average beam currents superior to 10 μ A for research and related applications.